**Our Place in Space (Answer key)**

**Creating a Scale Model of our Solar System**

**Scale factor for basketball-sized Sun\_\_**1.75 × 10-7 m/km**\_\_\_**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Object** | **Diameter (km)** | **Distance from Sun (km)** | **Scaled Diameter (cm)** | **Scaled Distance from Sun (m)** |
| **Sun** | 1.39 × 106 | 0.00 | 24.3 | 0.00 |
| **Mercury** | 4.88 × 103 | 5.83 × 107 | 0.085 | 10.2 |
| **Venus** | 1.21 × 104 | 1.08 × 108 | 0.21 | 18.9 |
| **Earth** | 1.28 × 104 | 1.496 × 108 | 0.22 | 26.1 |
| Moon | 3.48 × 103 | 3.84 × 105 (from Earth) | 0.06 | 6.7 cm from Earth |
| **Mars** | 6.79 × 103 | 2.27 × 108 | 0.12 | 39.6 |
| **Asteroids in Belt** | 1 — 940 | 3.08 × 108 — 4.89 × 108 | < 0.016 | 53.8 – 85.3 |
| **Jupiter** | 1.43 × 105 | 7.78 × 108 | 2.5 | 136 |

**In this scale model, where would some other objects be located?**

**Pluto \_**4.6 × 109 — 5.9 × 109**\_**km**\_ \_\_\_\_\_\_\_\_\_\_**805 – 1030**\_\_**m**\_**

***Voyager 1*  spacecraft \_\_\_\_**1.9 × 1010**\_**km**\_\_\_\_ \_\_\_\_\_\_**3300**\_\_**m**\_**

**Nearest star \_\_\_\_\_\_\_**4.2 × 1013**\_**km**\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_**7350 **\_\_\_\_**km**\_\_**

**(This is 4570 miles, not quite in Hawaii (~5500 mi) unless we travel through Earth)**

**Follow-up Question:** The *Voyager* spacecrafts have been traveling for 37 years. If a future spacecraft traveled as fast as the *Voyager 1* spacecraft, how long would it take to reach the nearest star?

In our model *Voyager 1* has traveled 3.3 km in 37 years, so to travel 7350 km will take about **82,000 years**!

**Follow-up Question:** The *New Horizons* spacecraft is taking 9.5 years to reach Pluto. Has it traveled faster or slower than *Voyager 1*?

*Voyager I* has traveled 89 m/yr in the model; *New Horizons* has traveled 85 m/yr, **slightly slower** (but faster than *Voyager 2*).